

## Second Note upon Freshwater Decapod Crustaceans from the Malay Peninsula

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(Plates XII & XIII)

In 1934 I described in this Bulletin<sup>1</sup> new fresh-water Decapod Crustaceans from the Malay Peninsula, which the Director of the Raffles Museum kindly sent to me for identification.

Further material from the mountain regions of the Peninsula, collected during the early part of 1935 by Mr. M. W. F. Tweedie, Curator of the Raffles Museum, has been received for examination together with other specimens from the collections of the Singapore Museum.

This new material contains one species of Macrurous and five species of Brachyurous Crustaceans as follows:

1. *Palaemon* (*Parapalaemon*) *trompi* de Man *armatus* n. subsp.
2. *Potamon* (*Potamiscus*) *cognatum* n. sp.
3. " ( " ) *raffesi* n. sp.
4. " ( " ) *pahangense* n. sp.
5. " (*Potamon*) *johorensis* n. sp.
6. *Paratelphusa* (*Peritelphusa*) *pilosimana* n. sp.

Stanley Kemp<sup>2</sup>, in describing a collection of river crabs from Siam and Annam remarks that the Potamonid fauna of these regions is one of exceptional richness and adds (p. 1): "It may be expected that further investigations will bring to light numerous additional species, many of which will probably have only a very limited range of distribution".

This assertion can also be applied to the mountain regions of the Malay Peninsula, the carcinological fauna of which is yet but imperfectly known.

The new forms described here are related to species which inhabit either the neighbouring countries of the Asiatic continent or the island of Borneo.

<sup>1</sup> Bulletin of the Raffles Museum, Singapore, No. 9, December, 1934.

<sup>2</sup> Journal of the Natural History Society of Siam, Vol. VI, No. 1, May 25th, 1923.

I wish to express my best thanks to the Director of the Raffles Museum not only for sending this interesting material but also for the generous permission to retain the type-specimens for the collection of the Basle Museum of Natural History.

## FAM. PALÆMONIDÆ

*Palæmon* (Parap.) *trompi* de Man subsp. *armatus* n. subsp.

Gunong Pulai, Johore, II & III, 1934. Numerous specimens, mostly young.

In the main characters these specimens agree very well with the species described from Borneo by de Man<sup>1</sup>. The only striking difference is the presence of small spinules on the merus and carpus, and of a pubescence of the fingers of the chelipeds.

The largest specimens ♂ and ♀ are 61 mm. long.

The slender rostrum extends normally as far as the end of the antennal scale; it runs horizontally forwards and is distally slightly upturned. The upper margin bears 10-11 teeth, occupying the whole length; usually 4 (or 3) are placed on the carapace. The teeth are equidistant, but the two proximal are often a little smaller than the others. There are 5-6 teeth on the lower border of the rostrum.

The greater part of the cephalothorax is smooth; the hepatic spine is situated just behind or a little below the antennal one.

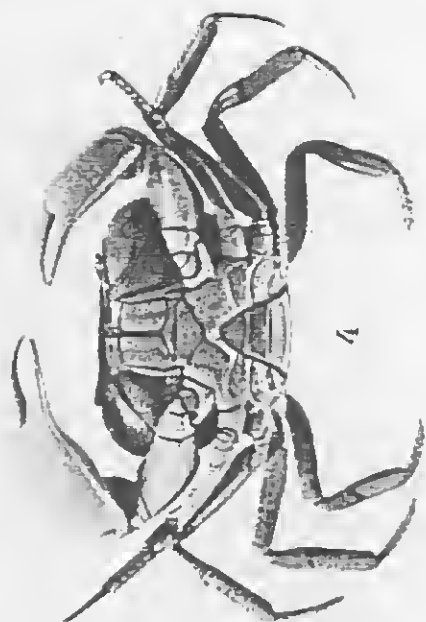
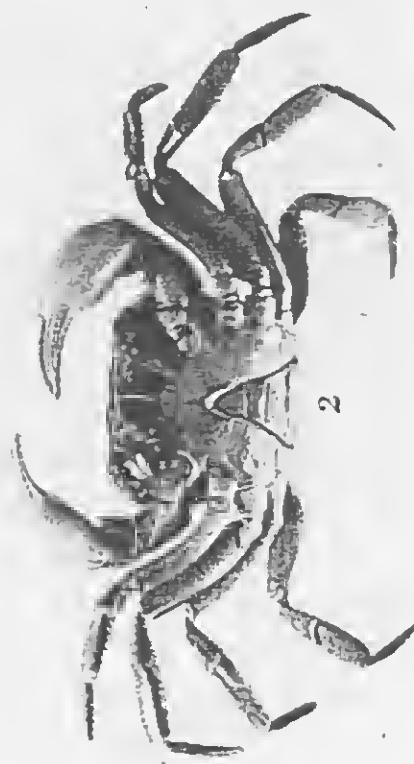
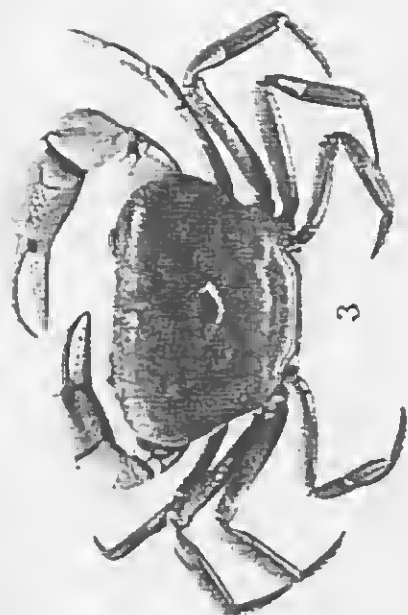
The first pair of legs exceeds the end of the antennal scale by  $\frac{1}{3}$  of their carpus; the palma and fingers of the chela are equal.

The second pair of chelipeds are subequal. The merus is a trifle shorter than the carpus, which widens towards its distal end. The chela is almost twice as long as the merus, the fingers being nearly as long as the palm. This latter joint is somewhat wider than the end of the carpus and gently depressed.

In both sexes the chelipeds are provided with long hairs, scattered on all their joints. Besides these hairs, in the ♂, the merus and the carpus are armed with small, sharply pointed spinules; palma without spinules but with a pubescence in its distal part, which is even more developed on the fingers. Each finger is armed with 5 obtuse teeth, the 3 proximal lower than the others but placed closer together. The distal tooth nearly at the middle point of the digit. The remaining part of the inner border is a sharp cutting edge.

Length of mature ♀ 52 mm.; the eggs are large (2 mm. long, 1, 3 mm. broad) but rather few in number.

1. Notes from the Leiden Museum, Vol. XX, p. 144, Pl. VII, fig. 2, 1893.



Malayan Potamonidae

The species was hitherto only known from Borneo.

I have described in 1932 from Sumatra a closely related species under the name *Pal. (Parap.) thienemanni*<sup>1</sup>. In this the carpus of the chelipeds is always a little shorter than the merus.

Dimensions of the II chelipeds

	♂		♀	
	left	right	left	right
Merus, length ..	9,5 mm.	8,5 mm.	9,5 mm.	9 mm.
Carpus ..	10,5 "	10. "	10. "	10. "
Chela, ..	20. "	18. "	19,5 "	19. "
Palma ..	11,5 "	9. "	10. "	9,5 "
Finger ..	9. "	9. "	9,5 "	9,5 "

*Palaemon (Parap.) trompi armatus* lives in the same waters as *Palaemon pilimanus* de Man.

FAM. POTAMONIDÆ

*Potamon (Potamiscus) cognatum* n. sp. (Pl. XII, fig. 1 & 2; text figs. 1 & 2).

Stream near River Yum, Headwaters River Plus, Perak, 2,500 feet, Malay Peninsula, 8 ♂, 12 ♀.

Carapace convex; the length  $\frac{4}{5}$  of the breadth; depth more than half the middle length.

Surface smooth, punctulated; the epigastric lobes are well indicated but not very prominent. Anteriorly they are slightly in advance of the orbital border. In the middle these two lobes are separated by a narrow furrow divided behind into two branches which are not very divergent. Forwards the furrow is visible on the basal half of the frontal surface. The postorbital cristæ are continuous with the epigastric but form with them an open angle; no furrow between the epigastric and the postorbital crests. The latter are directed transversely towards the antero-lateral border and are moderately raised. The front is slightly declivous; the anterior border, seen from above distinctly bilobed with a median inflexion. The frontal breadth is  $\frac{1}{3}$  of the maximum breadth of the cephalothorax.

Frontal surface convex, punctulated. Orbits oval, oblique; superior border smooth, inferior granulated. The extraorbital angle is not dentiform, being only slightly developed.

The antero-lateral border is arcuate and granulate; epibranchial tooth only indicated by a double granule in front of which we find a small inflexion. The postero-lateral border is of equal length with the anterior, with short parallel striæ.

<sup>1</sup> Archiv für Hydrobiologie, Suppl. Bd. XI, p. 570, 1932.

The mesogastric region is limited behind by the arcuate transverse groove. Between this and the branchial region is a shallow, oval depression, subcontinuous with the arcuate groove. On the branchial region, in the vicinity of the antero-lateral border, are some short rugosities. The posterior part of the cephalothorax is rather flat, with a transverse depression between the cardiac and the intestinal region.

In the third maxillipeds the ischial groove is central and slightly oblique; the exopodite is longer than the ischium and is entirely devoid of a flagellum. The merognath is a little broader than long.

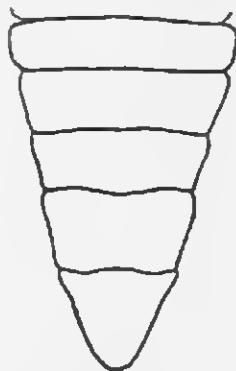


Fig. 1.



Fig. 2.

*Potamon (Potamiscus) cognatum.*

Fig. 1, male abdomen,  $\times 4$ ; fig. 2, first male appendage,  $\times 6$ .

In the  $\delta$  abdomen, the 6. segment is shorter than the last, which is distinctly broader than long. Sternum with a single transverse groove in front of the abdominal fossa. The 1.  $\delta$  appendage attains the 6. segment; it is feebly curved, with the distal end directed forwards.

The chelipeds are unequal in the  $\delta$ , equal in the  $\gamma$ . The external surface of all the joints is slightly rugose. Meropodite without a subterminal spine. Carpal spine well developed, pointed; in the lower part a small protuberance, single or double. Palma of the larger chela moderately inflated; digits with longitudinal, punctated, impressed lines, not or very feebly gaping.

Ambulatory legs rather stout; in the penultimate pair the merus three times as long as broad. The dactylus is longer than the propodus, with short yellow spines. This small species is closely related to *P. annandalei* Alcock<sup>1</sup> from N. India, but differs

<sup>1</sup>. Records of the Indian Museum, Vol. III, p. 246.

in the higher ratio between length and breadth of the carapace; the extraorbital angle is blunt, the front more bilobed, the epigastric crest forms an angle with the postorbital.

This new species shows also great resemblance to *Potamon* (*Potamiscus*) *tweedei* J. Roux<sup>1</sup>, which inhabits the same regions. The proportions of the carapace and the sculpture of the cephalothorax are identical, but the dimensions of the new species seem to remain smaller, the proportions of the abdominal segments are different and the exopodite of the third maxilliped is entirely devoid of a flagellum.

*Dimensions—*

		♂	♀
Maximum breadth	..	20 mm.	19 mm.
Length	..	16 "	15.5 "
Depth	..	10 "	10 "
Extraorbital breadth	..	13 "	12 "
Epibranchia	"	17 "	16 "
Posterior	"	7 "	7 "
Frontal	"	6 "	5.5 "

*Potamon* (*Potamiscus*) *rafflesi* n. sp. (Pl. XIII fig. 3 & 4; text figs. 3 & 4).

Gunong Tahan, Pahang, 5,500 feet, XII. 1912. 1 ♂. 2 ♀.

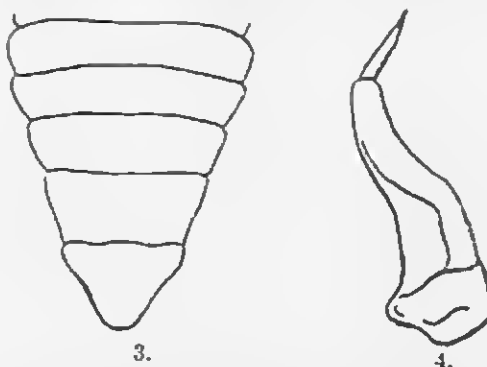
Carapace convex, punctulated. Length 7/10 of its greatest breadth; depth a little more than half the length. Anterior and antero-lateral regions feebly rugose. The epigastric and post-orbital crests not well marked, only indicated by feeble rugosities. The median epigastric furrow not deep, posteriorly divided into two divergent branches. Arcuated part of the cervical groove well defined, its lateral parts only indicated by a flat, short, oval depression, not continuous with the curved part.

Front less than a third of the greatest breadth of the carapace, its surface convex and moderately declivous. Its edge is broadly bilobed seen from above and the lateral borders are oblique. The superior border of the orbit arcuated and with a slight median inflexion; the external half of this border finely granulated. The inferior border strongly granulated, not forming an external tooth with the upper border. The anterior border of the epistome is also granulated. Antero-lateral border of the carapace bordered by a row of granules, epibranchia!

1. Bulletin of the Raffles Museum, Singapore, No. 9, p. 31, Pl. IV, fig. 3 & 4, 1934.

tooth not at all developed, but indicated by a very shallow inflexion. The border is regularly arcuated, a little shorter than the postero-lateral, which is provided with oblique, parallel lines. Side walls of the hepatic region rugose. Inferior surface of the carapace broadly pitted.

Mandibular palpus single. The ischium of the III. maxilliped bears a median groove, parallel to the border; exopodite with a rudiment of flagellum. Last abdominal segment of the  $\delta$  broader than long; the penultimate a little shorter than the last. Two shallow grooves on the sternum, the anterior transverse and deep, the posterior arcuate and more superficial.



*Potamon (Potamiscus) rafflesi*.

Fig. 3, male abdomen,  $\times 4$ ; fig. 4, first male appendage,  $\times 8$ .

The I. abdominal sexual appendage of the  $\delta$  is much arcuated, forming a double curve; the end part directed outwards.

In the  $\delta$  the chelipeds are unequal. The external surface of the joints is feebly rugose. Merus without subterminal spine, its edges crenulated. The carpal spine is blunt, very feebly protruding and with a large base; it is more a protuberance than a spine. In the larger chela the palm is inflated, the upper border a little shorter than the mobile finger. The fingers are arcuate, broadly gaping; the teeth of the inner border are numerous, unequal. The fingers of the smaller cheliped are straight and do not gape. Ambulatory legs long and slender; the meropodite of the penultimate pair is four times as long as broad. The narrow dactylus is longer than the propodite and bears short spines. In the  $\varphi$  the chelipeds are equal; their form is the same as in the small cheliped of the  $\delta$ .

# FRESHWATER DECAPOD CRUSTACEANS

This new species is related to *Pot. oblitteratum*. Kemp<sup>1</sup> of India, but the proportions of the carapace are different (0.8 in *oblitteratum*, 0.7 in *rafflesi*). In *Pot.oblitteratum* the epigastric and postorbital crests are more raised and the extraorbital angle and the epibranchial tooth are better developed.

## Dimensions—

		♂	♀
Maximum breadth	..	25 mm.	24 mm.
Length	..	17.5 "	17 "
Depth	..	10 "	10 "
Extraorbital breadth	..	15.5 "	15 "
Epibranchial	"	20 "	19.5 "
Posterior	"	7.5 "	8 "
Frontal	"	7 "	7 "

*Potamon (Potamiscus) pahangense* n. sp. Pl. XII fig. 5 & 6; text figs. 5 & 6).

Gunong Brinchang, Cameron Highlands, Pahang. III. 1935, alt. 6,300 feet, 4 ♂, 2 ♀, 2 juv.

Carapace very convex, about 7/10 as long as broad, its depth a little more than half its length.

The surface of the cephalothorax smooth, with very fine punctulation. Frontal, postfrontal and postorbital regions feebly rugose. Epigastric and postorbital crests only indicated by feeble rugosities, not raised. The epigastric furrow runs forwards onto the front and is divided behind into two divergent branches. Antero-lateral region almost smooth, in the vicinity of the border only a few rugulae. Side walls of the carapace punctulated.

Cervical groove well developed in its arcuated portion, which limits the mesogastric area; the lateral parts very feebly indicated by a shallow depression of the surface.

Front slightly bilobed and gently declivous, with a slight inflexion in its middle part; its breadth is a little less than 1/3 of that of the carapace. The orbits are oval, the lower border finely granulated, not forming a tooth on the external angle. The antero-lateral border is regularly arcuate, granulated and extends backward as far as the arcuated part of the cervical groove. The position of the epibranchial tooth is only marked by a small inflexion of the border and by a coarser granule. Postero-lateral border with feebly developed oblique lines.

<sup>1</sup>. Records of the Indian Museum, Vol. VIII, p. 296, Pl. 18, fig. 9 & 9a, 1913.



The ischial groove of the III. maxilliped runs slightly obliquely in the middle of the segment; the exopodite without flagellum. Meropodite distinctly broader than long.

Chelipeds unequal in the  $\delta$ , equal in the  $\sigma$ . The external surface of the merus and carpus is rugulose, but the palma is smooth. The carpal spine has a broad base and is short and not pointed; beneath there is a raised tubercle. Fingers not gaping; the mobile finger as long as the inferior border of the palma. Its surface with a few longitudinal, impressed lines. The ambulatory legs are elongated and slender; merus of the penultimate pair 4 times as long as broad. The dactylus is longer than the propodus.

Sternum punctulated, with two impressed lines in its anterior portion, the proximal one is transverse, the latter arcuate.

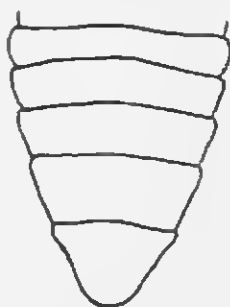


Fig. 5.



Fig. 6.

*Potamon (Potamiscus) pahungense.*

Fig. 5, male abdomen,  $\times 6$ ; fig. 6, first male appendage,  $\times 9$ .

In the  $\delta$ , the 6. abdominal segment is a little shorter than the last one, which is broader than long.

The first abdominal appendage of the  $\delta$  is faintly curved, its anterior part straight and pointed.

*Dimensions—*

		$\delta$	$\sigma$
Maximum breadth	..	13 mm.	17 mm.
Length	..	10 "	12 "
Depth	..	6 "	7 "
Extraorbital breadth	..	9.5 "	11 "
Epibranchial	..	11.6 "	14.5 "
Posterior	..	4.5 "	6.5 "
Frontal	..	4 "	5 "

This species is related to *Pot. sikkimense* Rathb.<sup>1</sup>; but our species is not so rugose, the epigastric crests are indistinct and the proportions of the abdominal segments in the ♂ are different.

Key for determination of the Malayan species of the subgenus *Potamiscus*.

A.—Ratio between length and breadth of carapace between 0.75 and 0.8. Meropodite of the penultimate pair of legs less than 4 times as long as broad

(a) Postorbital crests rugulose, forming a curve with the epigastric crests, no furrow in between. Cervical groove laterally cutting the postorb. crest. Exopodite of III. maxilliped with a vestigial flagellum .. *chaseni* J. Roux<sup>2</sup>.

(b) Postorbital crests forming a raised transverse line, separated from the epigastric crests by a distinct furrow. Cervical groove laterally a short depression, not cutting the postorbital crests. Exopodite of III. maxilliped without flagellum .. *twedei* J. Roux<sup>2</sup>.

(c) Postorbital crests moderate, continuous with the epigastric crests with which they form an angle. Exopodite of III. maxilliped without flagellum .. *cognatum* n. sp.

B.—Ratio between length and breadth of carapace between 0.7 and 0.75. Meropodite of the penultimate pair of legs at least 4 times as long as broad. Epigastric and postorbital cristæ not raised, only faintly marked.

(a) Front distinctly bilobed. Exopodite of III. maxilliped with a vestigial flagellum. Fingers of the great chela arcuate and strongly gaping. 1. ♂ appendage with a double curvature, the end directed outwards .. *rafflesi* n. sp.

1. RATHBUN, M., Nouv. Arch. Mus. Paris, VII, p. 219 (pl. 18, fig. 7 in Vol. VI) 1905, as *Geotelphusa*;

ALCOCK, A., Catalog. Ind. Decap., I, fasc. 2, p. 56, fig. 48, 1910, as *Potamiscus*.

2. For the sake of completeness figures of the male abdomen and sexual appendage of these two species are included herein.

(b) Front slightly bilobed. Exopodite of III. maxilliped without flagellum. Fingers of great chela rather straight, not gaping. 1.  $\delta$  appendage only curved in its basal part, the end directed forwards .. *pahangensis* n. sp.

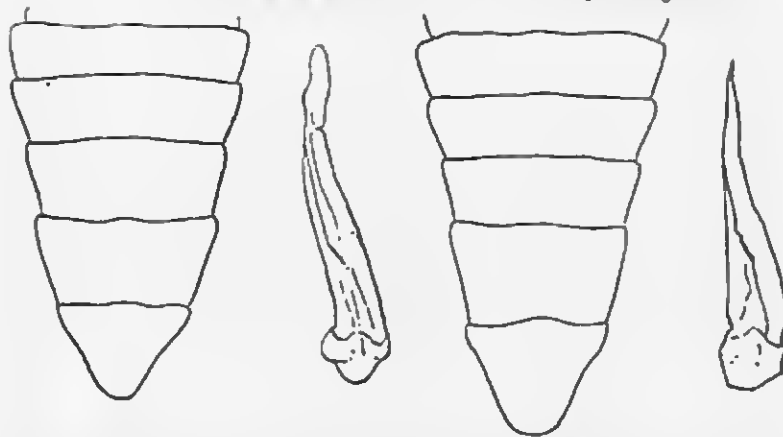


Fig. 7. Fig. 8. Fig. 9. Fig. 10.  
*Potamon (Potamiscus) chaseni*. Fig. 7, male abdomen,  $\times 3$ ; fig. 8, first male appendage,  $\times 4$ ; *Potamon (Potamiscus) tweedei*. Fig. 9, male abdomen,  $\times 3$ ; fig. 10, first male appendage,  $\times 4$ .

*Potamon (Potamon) johorensis* n. sp. (Pl. XIII fig. 1 & 2; text figs. 11 & 12).

Gunong Pulai, Johore, IV & V 1934, 1  $\delta$ , 1 juv.; Bukit Timah, Singapore, X. 1933, 1  $\sigma$ , 1 juv.

*Description of the  $\delta$  from Gunong Pulai (Type specimen).* The length of the cephalothorax is  $3/4$  of the greatest breadth; its depth about  $3/5$  of the length. The carapace is not very convex in the longitudinal direction.

The central part of the cervical groove is deeply cut and almost semicircular; the lateral part, which is in continuation with the semicircle, is not very deep, sinuous and rather superficial, being faintly indicated as far as near the base of the epibranchial tooth. The lateral limits of the mesogastric region are well defined; this part is not  $1/3$  of the maximum breadth of the cephalothorax. The cardiac region is only faintly marked.

The carapace is finely granulated and densely hairy, especially on the sides and on the frontal region. Suborbital region punctulated; the side walls of the carapace rugose and also hairy.

Epigastric and postorbital cristæ forming a curved line. The epigastric are low, oblique, rugulose and separated from one another by a well defined furrow which is bifurcated posteriorly, forming two long branches; anteriorly they do not reach further than the posterior line of the orbits, laterally they are separated from the postorbital crests by a shallow, sometimes ill defined furrow. Postorbital crests gently curved, forming a low line to about  $\frac{2}{3}$  of the length of the orbit. In their external part, the crests are divided into rugulæ reaching to the base of the epibranchial tooth. The bilobed front is about  $\frac{1}{3}$  of the maximum breadth of the carapace; it is not much declivous, its surface is coarsely granulated and pilose.

The smooth frontal border is broadly emarginated in its middle part, its lateral borders being slightly divergent posteriorly. Upper border of the orbit smooth, the inferior granulated. Outer orbital angle blunt, without hiatus on the inferior border.

Antero-lateral border arcuate, bearing a finely haired, crenulated crest, reaching posteriorly to the latitude of the curved part of the cervical groove. Epibranchial tooth small, but well developed. The postero-lateral border is provided with oblique lines and with numerous hairs. Cardiac area pitted, intestinal region pilose.

The ischium of the third maxilliped is coarsely pitted, provided with hairs and bears the usual slightly oblique groove in its middle; the exopodite is hairy and is provided with a long flagellum. Merognath broader than long.

Sternum of ♂ with some hairs and with two anterior grooves, the distal one transverse, the other arcuate.

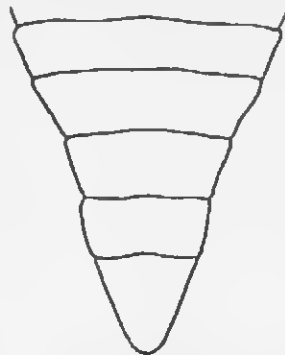


Fig. 11.



Fig. 12.

*Potamon (Potamon) johorensis.*

Fig. 11, male abdomen; fig. 12, first male appendage.

The ♂ abdomen is regularly triangular, its terminal segment nearly as long as broad. The 6th. segment much shorter than the last one, its length being almost half of the basal breadth. The 5th. segment longer than the 6th. but shorter than the 7th.

Chelipeds of ♂ slightly unequal, with some hairs, the external surface of the segments provided with low rugulae. The merus is devoid of a subterminal spine, the edges are granulated. Carpus with a spine and with a small tubercle below it; the external surface of this joint is rather flattened and areolated. Palm swollen, its interior surface smooth or with few granules, the external rugulose. The height of the palm is  $\frac{4}{5}$  of its maximum length and the depth  $\frac{4}{5}$  of the height. The digits are decorated with longitudinal, impressed lines; they are not gaping and the teeth of its inner border are unequal.

The walking legs are rather narrow and slender; the penultimate pair has a total length of  $1\frac{2}{3}$  the breadth of the carapace. The meropodite of this leg is three times as long as broad; the dactylus is a little longer than the upper border of the propodite; the segments are covered with hairs, especially the two distal ones.

The first ♂ appendage reaches to the end of the 6th. abdominal segment; its basal portion is flattened, narrowing anteriorly, the end pointed and bent outwards.

The ♀ from Bukit Timah, Singapore agrees very well with the description of the ♂ from Johore; the cervical groove is laterally even more superficial and subcontinuous with the curved part.

The chelipeds are equal, smaller than those of the ♂. the palm is also less inflated. Abdomen broad, rounded, the last segment being a little longer than the foregoing one.

The round eggs are not numerous but of a large size (diam. 1.8 mm.). Colour of the carapace greenish-brown, the chelipeds yellowish-brown. In the younger specimens the cephalothorax is more hairy.

*Dimensions—*

(Type from Johore) (Bukit Timah)

		♂	♀
Maximum breadth	..	21.5 mm.	20 mm.
Length	..	16.5 "	17 "
Depth	..	9.5 "	9 "
Extraorbital breadth	..	16 "	15 "
Epibranchial	"	19 "	19 "
Posterior	"	9 "	9.5 "
Frontal	"	6.5 "	6.5 "

This small species is related to *Pot. hispidum* Wood-Mason<sup>1</sup> of Burma, but the cephalothorax is narrower, the epibranchial tooth better developed, the form and proportions of the two last abdominal segments in the ♂ are different.

*Paratelphusa* (*Peritelphusa*) *pilosimana* n. sp. (Pl. XII fig. 3 & 4; text figs. 13 & 14).

Kuala Tahan, Pahang, XI. 1921, 1 ♂. (the type); Bukit Chintamani, near Bentong, Pahang, VIII. 1935, a series of both sexes.

Cephalothorax slightly convex in the longitudinal direction; length 0.85 of the maximum breadth; depth more than half the length.

The surface of the carapace is finely pitted. The H groove is well developed, especially the lateral branches of the H. The lateral portion of the cervical groove is a broad, shallow depression, which has a slight oblique direction. Branchial regions not inflated, adorned with rounded rugulae. The frontal surface is flat, moderately declivous. Epigastric crests short, moderately raised, crescent shaped, with the concavity forwards. The median furrow is short. Supraorbital crests absent, replaced by very feeble rugosities.

Front broadly bilobed, a little less than  $\frac{1}{3}$  of the breadth of the cephalothorax; its lateral borders very oblique. Supraorbital border thin, entire, upturned, especially in its inner part. The inferior border finely granular and with long brown hairs.

Antero-lateral border short, not very arcuate; there is only a small difference between the epibranchial and the maximum breadth of the cephalothorax. The border has a distinct inflexion at the base of the epibranchial tooth; this tooth is pointed but short and directed forwards. Behind the tooth the border is more raised. Postero-lateral border longer than the preceding, bearing a few parallel, oblique striae. The distance between the extraorbital angle and the epibranchial tooth is contained 4 times in the length of the postero-lateral border. Inferior surface of the carapace sparsely punctulated.

Mandibular palpus bilobate. Exopodite of the ischium with a long and plumose flagellum. Longitudinal groove of the ischium placed rather closer to the inner border than to the outer. Merognath broader than long, its antero-lateral lobe not expanded.

Abdomen of the ♂ of the typical form for the genus, narrowed from the 5th segment to the end. The 6th segment is

<sup>1</sup> Journ. Asiat. Soc. Bengal, Vol. XL, part 2, p. 452, Pl. XXVII, fig. 1-5, 1871.

a little longer than broad and a trifle longer than the 7th; its lateral borders are distally slightly divergent. The 7th segment is as long as broad, its sides feebly concave.

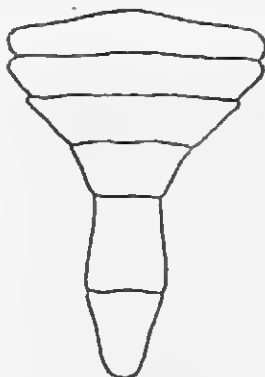


Fig. 13.



Fig. 14.

*Parutelphusa (Peritelphusa) pilosimana.*

Fig. 13, male abdomen,  $\times 4$ ; fig. 14, first male appendage,  $\times 8$ .

The first  $\delta$  appendage is short and inclined inwards, its terminal part very small, directed forwards.

Sternum without any furrow before the abdominal groove.

Chelipeds unequal, short and massive. The meropodite bears a subterminal spine, which is short but distinct; the external surface of this segment is squamous, its antero-inferior border provided with long and fine hairs. Carpal spine well developed, with a large base and surrounded with long hairs. External face of carpus and palma with short squamiform markings. The palmar portion of the great chela is slightly compressed; its depth is nearly half its height. The fingers are distinctly compressed and slightly hollowed internally. The fixed finger is thicker than the other, its outer surface, near the inferior border decorated with a row of tubercles and two longitudinal impressed lines. The teeth are unequal and in the middle of the series there is a larger tooth. Both borders of the palma the upper border of the mobile finger and the inferior border of the fixed finger provided with long, brown silky hairs. The small cheliped shows the same characters. The walking legs are short; the meropodite with a subterminal pointed spine on its upper border. In the penultimate pair this segment is  $2 \frac{2}{3}$  times as long as broad and as long as the carpus and the propodus together. Dactylus a little longer than the propodus,  $3 \frac{1}{2}$  as long as broad and with spines on the borders.

# FRESHWATER DECAPOD CRUSTACEANS

The female agrees with the male in the size and proportions of the body, but the pilosity of the chelipeds and ambulatory legs is absent.

## Dimensions—

	♀	♂ (type)
Maximum breadth ..	18.5	16.5 m.m.
Length ..	17	15
Depth ..	10.5	8
Extraorbital breadth ..	13.5	13
Epibranchial breadth ..	17.5	16
Posterior breadth ..	11	8.5
Frontal breadth ..	6.5	6.5

This subgenus was hitherto known only from Borneo, where it is represented by the species *borneensis* von Mart.<sup>1</sup>), *borneensis hilaris* de M.,<sup>2</sup> *büttikoferi* de M.<sup>2</sup> and *sylvicola* de M.<sup>2</sup>

Our new species is related to *borneensis*. In this last species the epibranchial tooth is placed further back and the particularities of the chelipeds are different in the two species.

## EXPLANATION OF PLATES

### PLATE XII

- Fig. 1. *Potamon (Potamiscus) cognatus* n. sp. Dorsal view,  $\times 1 \frac{1}{2}$ .  
 Fig. 2.  $\times 1 \frac{1}{2}$ . Ventral view,  
 Fig. 3. *Paratelphusa (Peritelphusa) pilosimana* n. sp. Dorsal view,  $\times 1 \frac{1}{2}$ .  
 Fig. 4. Ventral view,  $\times 1 \frac{1}{2}$ .  
 Fig. 5. *Potamon (Potamiscus) pahangenes* n. sp. Dorsal view,  $\times 2$ .  
 Fig. 6. view,  $\times 2$ . Ventral

### PLATE XIII

- Fig. 1. *Potamon (Potamon) johorensis* n. sp. Dorsal view,  $\times 1 \frac{1}{2}$ .  
 Fig. 2.  $\times 1 \frac{1}{2}$ . Ventral view,  
 Fig. 3. *Potamon (Potamiscus) rafflesi* n. sp. Dorsal view,  $\times 1 \frac{1}{2}$ .  
 Fig. 4.  $\times 1 \frac{1}{2}$ . Ventral view.

<sup>1</sup>. VON MARTENS: Archiv für Naturgesch., Vol. XXXIV, 1 p. 18, 1868, as *Telphusa*.

<sup>2</sup>. DE MAN. J. G.: Notes of the Leiden Museum, Vol. XXI, p. 71. ff. as *Potamon (Peritelphusa)*.